

Assignment Sheet / Density Test

Project Number: 23502-ZS9Lab. Tech: K. FordProject Name: HSRDate Completed: 10/2/13Date Drilled: 9/13/13Boring: \$0030R

Sample	Depth	Tests	Soil Wt	Length	Diameter	Wet Wt	Dry Wt	Wet	Moisture	Dry	Soil
			Gms	in	in	Gms	Gms	Density	%	Density	Classification
B01	0-5	PH,MR,SA,CHEM				200	181.3		10.3%		SM
SS02	6-6.5	SA				262	222.8		17.5%		SP
MC03-1	11-11.5	DD,DS	763.5	6.02	2.42	112	111.8	105.1	0.3%	104.8	SP
SS04	16-16.5	SA				261	218.6		19.4%		SP
SS06	26-26.5	SA				279	225.0		24.1%		SM
MC07-1	31-31.5	DD,DS	827.1	6.02	2.42	88	82.0	113.8	7.7%	105.7	SP
SS08	36-36.5	SA				242	226.5		6.7%		SP
MC10-1	43-43.5	DD,TRX	642.6	4.62	2.42	53	41.7	115.2	27.1%	90.7	SM
SS11	46-46.5	HY,SA									SM
MC14-1	60.8-61.3	Pl									ML/SM
MC14-2	60.8-61.4	PI									ML/SM
MC16-2	70.5-71	PI,DD	873.3	6.02	2.42	200	158.5	120.2	26.2%	95.2	SP/SM
SS19	86-86.5	SA				238	215.3		10.5%		SM

Notes:

CHEM Sulfate/Chloride MR Minimum Resistivity

COLL Collapse PH pH Test
CONSOL 1D Consolidation PI Atterberg Limits

CURV Modified Proctor RV R-value

DD Moisture Density SA Sieve Analysis
DS Direct Shear TRX Triaxial Compression

HY Hydrometer

MOISTURE & DENSITY TEST ISI Lab No.: G-52923 Client: URS/ARUP/HMM JV Project: California High Speed Train Job no: 2636-001.0 S0029R S0033AR S0069AR S0069AR S0069AR S0069R Boring # S0029R S0030R Sample # MC09-2 U10 MC10-3 SS16 U11 MC16-1 MC18-1 MC02-2 5.5-6.0 Depth (ft.) 41.0-41.5 42.0-44.5 42.0-42.5 50.0-51.5 42.0-44.5 65.0-66.5 75.0-76.5 Grayish brown Olive brown sandy Greenish gray Grayish brown silt Olive brown sandy Olive gray sandy Olive brown silty Grayish green Soil type: (visual) with sand clay with sand silty clay silt clayey sand clay clay (BAGGIE COULD NOT DO MD) 01/15/14 1. Date tested: 01/17/14 01/17/14 01/17/14 01/17/14 01/17/14 01/17/14 01/17/14 1. 2. Tested by: JH JΗ JH JΗ JΗ JH JΗ JH 3. Specimen height (in.) 5.96 3.96 6.00 6.00 5.95 3. 3.93 5.90 900.72 868.95 815.58 880.48 951.22 956.29 897.34 4. Wt. of specimen + tare (gm) 4. 0.00 0.00 0.00 0.00 0.00 0.00 0.00 5. 5. Tare wt. (gm) 6. Diameter (in.) 2.41 2.85 2.37 2.87 2.42 2.42 2.41 7. Wet wt. of soil + dish wt. (gm) 276.47 264.91 298.04 98.44 273.64 275.82 301.24 293.74 8. Dry wt. of soil + dish wt. (gm) 229.46 229.54 247.22 90.20 239.02 239.79 257.94 255.15 8. 9. Wt. of dish (gm) 50.59 50.41 50.06 50.96 51.20 50.87 50.41 50.89 9. 10. Dish ID 10. Wet Density (pcf) 126.1 131.9 119.3 130.8 131.2 131.9 125.8 Dry Density (pcf) 99.9 110.2 94.8 110.5 110.2 109.1 105.8 **Moisture Content (%)** 26.3 19.7 25.8 21.0 18.4 19.1 20.9 18.9 Gs (Assumed) 2.70 2.70 2.70 2.70 2.70 2.70 2.70 2.70 Void Ratio 0.687 0.529 0.525 0.529 0.544 0.592 0.777 Saturation (%) 86.2 103.3 100.7 89.6 94.8 97.3 103.6 Additional data: Wt. of dry soil + dish before washing (gm) Wt. of dry soil + dish after washing (gm) % Passing # 200 sieve **USCS** symbol



Sieve Analysis for Soil / Fine Aggregate ASTM C-136

 Project:
 CA HSR
 Technician:
 K. Ford

 Date:
 9/26/2013

 TES#:
 23502-ZS9
 Sample No.:
 B01

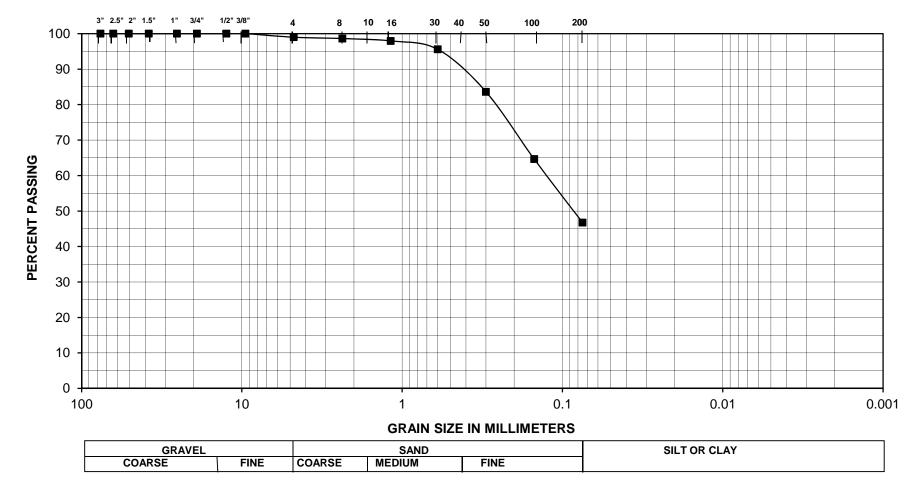
 Boring #:
 S0030R; 0-5'
 Classification:
 (SM/ML) Silty Sand

	Weight (lbs. or grams)	Maximum Sieve Size	Minimum Weight of Test Specimen, lbs. (kg)
Total Dry Sample + Tare Wt.		Sand	1.0 (0.5)
Tare Weight		3/8"	2.0 (1.0)
Total Dry Sample Wt.	181.3	1/2"	4.0 (2.0)
Initial Weight Fine		3/4"	11.0 (5.0)
Aggregate Before Wash	181.3	1"	22.0 (10.0)
Final Weight Fine		1 1/2"	33.0 (15.0)
Aggregate After Wash	102.3	2"	44.0 (20.0)

0:	Cumulative	Individual	Cumulative	Cumulative	
Sieve	Weight	Weights	%	%	
Size	Retained	Retained	Retained	Passing	Specs.
3 in.			0.0	100.0	
2 1/2 in.			0.0	100.0	
2 in.			0.0	100.0	
1 1/2 in.			0.0	100.0	
1 in.			0.0	100.0	
3/4 in.			0.0	100.0	
1/2 in.			0.0	100.0	
3/8 in.			0.0	100.0	
#4	1.8	0.0	1.0	99.0	
#8	2.5	0.7	1.4	98.6	
#16	3.7	1.2	2.0	98.0	
#30	8.0	4.3	4.4	95.6	
#50	29.7	21.7	16.4	83.6	
#100	64.1	34.4	35.4	64.6	
#200	96.5	32.4	53.2	46.8	
Pan	102.3				



U.S. STANDARD SIEVE NUMBERS



■ B01	
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Sample #	Classification	% Gravel	% Sand	% Silt	% Clay	% Moist.	LL	PL	PΙ	Project:	CA HSR
B01	(SM/ML) Silty Sand	1.0	52.2	46.8							
										TES#:	23502-ZS9
										Boring #	S0030R; 0-5'
										Date:	9/26/2013



Sieve Analysis for Soil / Fine Aggregate ASTM C-136

 Project:
 CA HSR
 Technician:
 K. Ford

 Date:
 9/26/2013

 TES#:
 23502-ZS9
 Sample No.:
 SS02

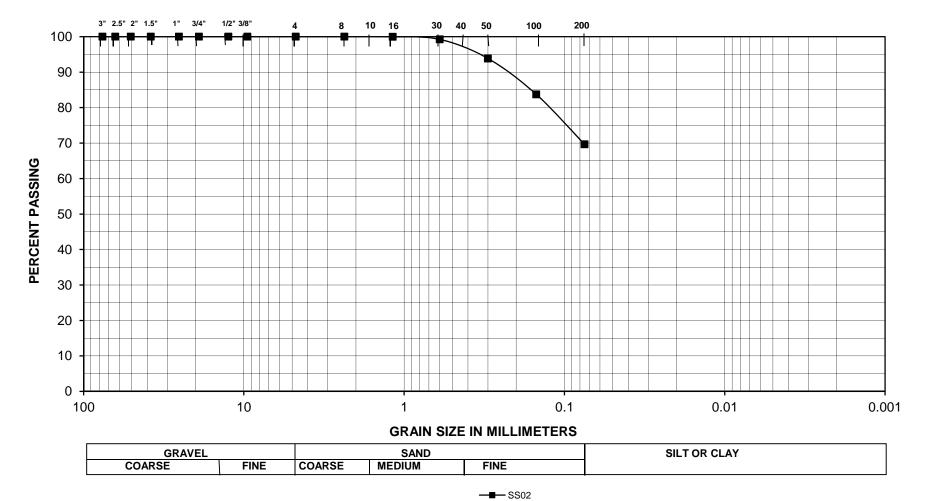
 Boring #:
 S0030R; 6-6.5'
 Classification:
 (ML) Sandy Silt

	Weight	Maximum	Minimum Weight of
	(lbs. or grams)	Sieve Size	Test Specimen, lbs. (kg)
Total Dry Sample + Tare Wt.		Sand	1.0 (0.5)
Tare Weight		3/8"	2.0 (1.0)
Total Dry Sample Wt.	222.8	1/2"	4.0 (2.0)
Initial Weight Fine		3/4"	11.0 (5.0)
Aggregate Before Wash	222.8	1"	22.0 (10.0)
Final Weight Fine		1 1/2"	33.0 (15.0)
Aggregate After Wash	75.4	2"	44.0 (20.0)

	Cumulative	Individual	Cumulative	Cumulative	
Sieve	Weight	Weights	%	%	
Size	Retained	Retained	Retained	Passing	Specs.
3 in.			0.0	100.0	
2 1/2 in.			0.0	100.0	
2 in.			0.0	100.0	
1 1/2 in.			0.0	100.0	
1 in.			0.0	100.0	
3/4 in.			0.0	100.0	
1/2 in.			0.0	100.0	
3/8 in.			0.0	100.0	
#4	0.0	0.0	0.0	100.0	
#8	0.0	0.0	0.0	100.0	
#16	0.1	0.1	0.0	100.0	
#30	1.7	1.6	0.8	99.2	
#50	13.7	12.0	6.1	93.9	
#100	36.2	22.5	16.2	83.8	
#200	67.6	31.4	30.3	69.7	
Pan	75.4				



U.S. STANDARD SIEVE NUMBERS



	SSC
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Sample #	Classification	% Gravel	% Sand	% Silt	% Clay	% Moist.	LL	PL	Pl	Project:	CA HSR
SS02	(ML) Sandy Silt	0	30.3	69.7							
										TES#:	23502-ZS9
										Boring #	S0030R; 6-6.5'
							•		·	Date:	9/26/2013



Sieve Analysis for Soil / Fine Aggregate ASTM C-136

 Project:
 CA HSR
 Technician:
 K. Ford

 Date:
 9/26/2013

 TES#:
 23502-ZS9
 Sample No.:
 SS04

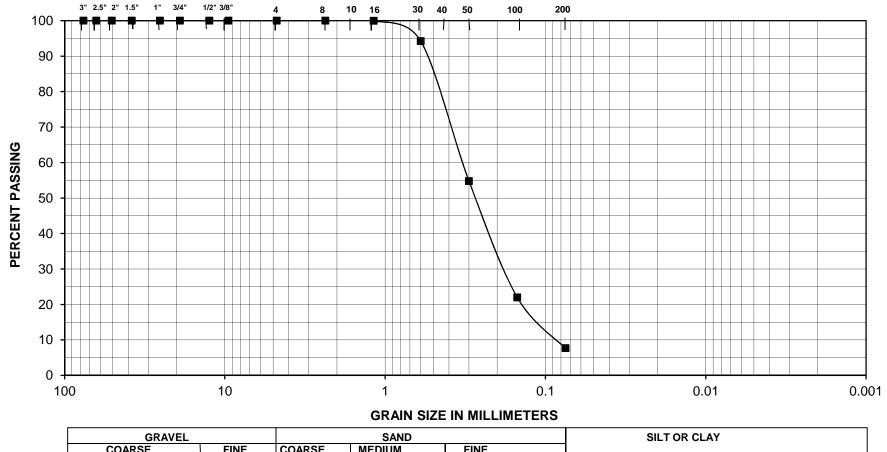
 Boring #:
 S0030R; 16-16.5'
 Classification:
 (SP) Fine Sand

	Weight	Maximum	Minimum Weight of
	(lbs. or grams)	Sieve Size	Test Specimen, lbs. (kg)
Total Dry Sample + Tare Wt.		Sand	1.0 (0.5)
Tare Weight		3/8"	2.0 (1.0)
Total Dry Sample Wt.	218.6	1/2"	4.0 (2.0)
Initial Weight Fine		3/4"	11.0 (5.0)
Aggregate Before Wash	218.6	1"	22.0 (10.0)
Final Weight Fine		1 1/2"	33.0 (15.0)
Aggregate After Wash	203.7	2"	44.0 (20.0)

	Cumulative	Individual	Cumulative	Cumulative	
Sieve	Weight	Weights	%	%	
Size	Retained	Retained	Retained	Passing	Specs.
3 in.			0.0	100.0	
2 1/2 in.			0.0	100.0	
2 in.			0.0	100.0	
1 1/2 in.			0.0	100.0	
1 in.			0.0	100.0	
3/4 in.			0.0	100.0	
1/2 in.			0.0	100.0	
3/8 in.			0.0	100.0	
#4	0.0	0.0	0.0	100.0	
#8	0.0	0.0	0.0	100.0	
#16	0.1	0.1	0.0	100.0	
#30	12.6	12.5	5.8	94.2	
#50	98.8	86.2	45.2	54.8	
#100	170.5	71.7	78.0	22.0	
#200	201.8	31.3	92.3	7.7	
Pan	203.7				



U.S. STANDARD SIEVE NUMBERS



GRAVEL			SAND		SILT OR CLAY
COARSE	FINE	COARSE	MEDIUM	FINE	

--■- SS04

Sample #	Classification	% Gravel	% Sand	% Silt	% Clay	% Moist.	LL	PL	PI	Project:	CA HSR
SS04	(SP) Fine Sand	0	92.3	7.7							
										TES#:	23502-ZS9
										Boring #	S0030R; 16-16.5'
										Date:	9/26/2013



Sieve Analysis for Soil / Fine Aggregate ASTM C-136

 Project:
 CA HSR
 Technician:
 K. Ford

 Date:
 9/26/2013

 TES#:
 23502-ZS9
 Sample No.:
 SS06

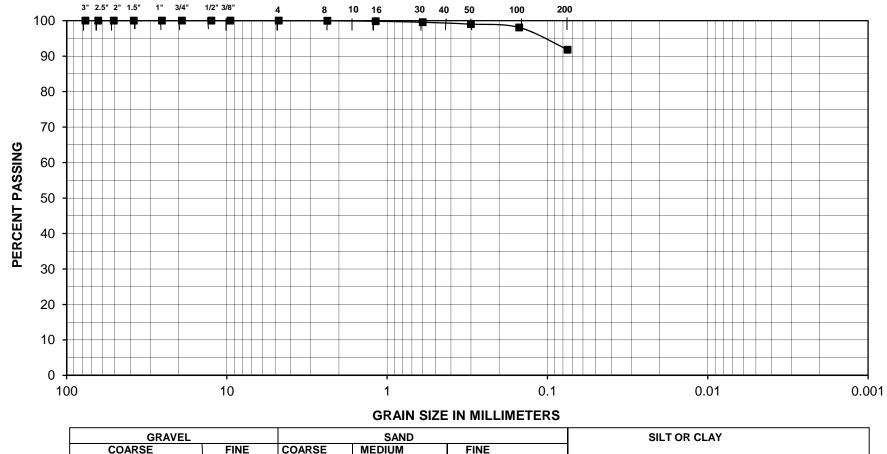
 Boring #:
 S0030R; 26-26.5'
 Classification:
 (ML) Silt

	Weight	Maximum	Minimum Weight of
	(lbs. or grams)	Sieve Size	Test Specimen, lbs. (kg)
Total Dry Sample + Tare Wt.		Sand	1.0 (0.5)
Tare Weight		3/8"	2.0 (1.0)
Total Dry Sample Wt.	225.0	1/2"	4.0 (2.0)
Initial Weight Fine		3/4"	11.0 (5.0)
Aggregate Before Wash	225	1"	22.0 (10.0)
Final Weight Fine		1 1/2"	33.0 (15.0)
Aggregate After Wash	26.8	2"	44.0 (20.0)

Ciovo	Cumulative	Individual	Cumulative	Cumulative	
Sieve	Weight	Weights	%	%	
Size	Retained	Retained	Retained	Passing	Specs.
3 in.			0.0	100.0	
2 1/2 in.			0.0	100.0	
2 in.			0.0	100.0	
1 1/2 in.			0.0	100.0	
1 in.			0.0	100.0	
3/4 in.			0.0	100.0	
1/2 in.			0.0	100.0	
3/8 in.			0.0	100.0	
#4	0.0	0.0	0.0	100.0	
#8	0.1	0.1	0.0	100.0	
#16	0.4	0.3	0.2	99.8	
#30	1.0	0.6	0.4	99.6	
#50	2.2	1.2	1.0	99.0	
#100	4.3	2.1	1.9	98.1	
#200	18.4	14.1	8.2	91.8	
Pan	26.8				



U.S. STANDARD SIEVE NUMBERS



GRAVEL			SAND		SILT OR CLAY
COARSE	FINE	COARSE	MEDIUM	FINE	

--■- SS06

Sample #	Classification	% Gravel	% Sand	% Silt	% Clay	% Moist.	LL	PL	PI	Project:	CA HSR
SS06	(ML) Silt	0	8.2	91.8							
										TES#:	23502-ZS9
										Boring #	S0030R; 26-26.5'
										Date:	9/26/2013



Sieve Analysis for Soil / Fine Aggregate ASTM C-136

 Project:
 CA HSR
 Technician:
 K. Ford

 Date:
 9/26/2013

 TES#:
 23502-ZS9
 Sample No.:
 SS08

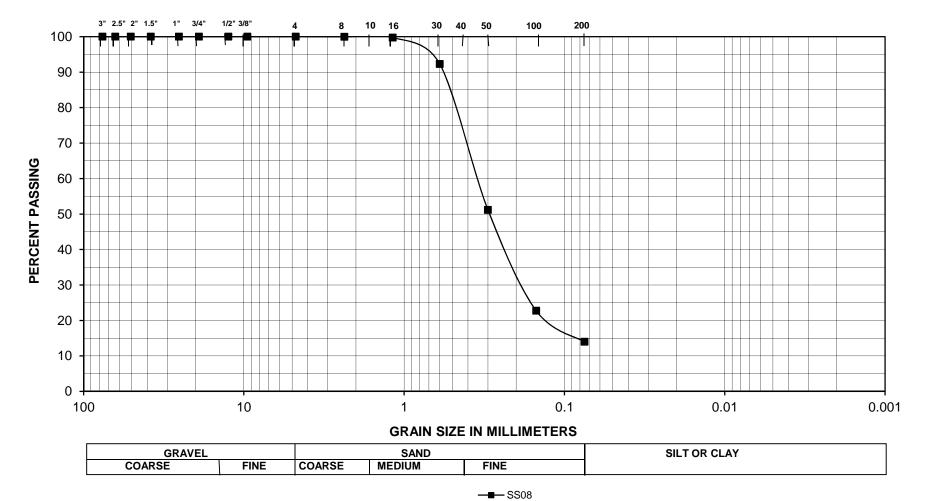
 Boring #:
 S0030R; 36-36.5'
 Classification:
 (SM) Fine Silty Sand

	Weight	Maximum	Minimum Weight of
	(lbs. or grams)	Sieve Size	Test Specimen, lbs. (kg)
Total Dry Sample + Tare Wt.		Sand	1.0 (0.5)
Tare Weight		3/8"	2.0 (1.0)
Total Dry Sample Wt.	226.5	1/2"	4.0 (2.0)
Initial Weight Fine		3/4"	11.0 (5.0)
Aggregate Before Wash	226.5	1"	22.0 (10.0)
Final Weight Fine		1 1/2"	33.0 (15.0)
Aggregate After Wash	195.1	2"	44.0 (20.0)

0:	Cumulative	Individual	Cumulative	Cumulative	
Sieve	Weight	Weights	%	%	
Size	Retained	Retained	Retained	Passing	Specs.
3 in.			0.0	100.0	
2 1/2 in.			0.0	100.0	
2 in.			0.0	100.0	
1 1/2 in.			0.0	100.0	
1 in.			0.0	100.0	
3/4 in.			0.0	100.0	
1/2 in.			0.0	100.0	
3/8 in.			0.0	100.0	
#4	0.0	0.0	0.0	100.0	
#8	0.1	0.1	0.0	100.0	
#16	0.6	0.5	0.3	99.7	
#30	17.4	16.8	7.7	92.3	
#50	110.6	93.2	48.8	51.2	
#100	175.0	64.4	77.3	22.7	
#200	194.8	19.8	86.0	14.0	
Pan	195.1				



U.S. STANDARD SIEVE NUMBERS



Sample #	Classification	% Gravel	% Sand	% Silt	% Clay	% Moist.	LL	PL	PI	Project:	CA HSR
SS08	(SM) Fine Silty Sand	0	86.0	14.0						•	
										TES#:	23502-ZS9
										Boring #	S0030R; 36-36.5'
										Date:	9/26/2013
	_										



Sieve Analysis for Soil and Fine Aggregate

 Project:
 CA HSR FRE_BAK
 Technician:
 K. Ford

 Date:
 9/20/2013

 TES#:
 23502-ZS9
 Sample No.:
 SS11

 Boring No.:
 S0030R
 Remarks:
 (SM) Fine Silty Sand

	Weight (grams)	Maximum Sieve Size	Minimum Weight of Test Specimen, lbs. (kg)
Total Dry Sample + Tare Wt.	,	Sand	1.0 (0.5)
Tare Weight		3/8"	2.0 (1.0)
Total Dry Sample Wt.	99.6	1/2"	4.0 (2.0)
Initial Weight Fine		3/4"	11.0 (5.0)
Soil Before Wash	99.6	1"	22.0 (10.0)
Final Weight Fine		1 1/2"	33.0 (15.0)
Soil After Wash	69.2	2"	44.0 (20.0)

	Individual	Individual	Combined	Combined	
Sieve	Weight	%	%	%	
Size	Retained	Retained	Retained	Passing	Specs.
3 in.	0.0	0.0	0.0	100.0	
2 1/2 in.	0.0	0.0	0.0	100.0	
2 in.	0.0	0.0	0.0	100.0	
1 1/2 in.	0.0	0.0	0.0	100.0	
1 in.	0.0	0.0	0.0	100.0	
3/4 in.	0.0	0.0	0.0	100.0	
1/2 in.	0.0	0.0	0.0	100.0	
3/8 in.	0.0	0.0	0.0	100.0	
#4	0.0	0.0	0.0	100.0	
#8	0.7	0.7	0.7	99.3	
#10	0.0	0.0	0.7	99.3	
#16	0.2	0.2	0.9	98.2	
#30	12.5	12.6	13.5	86.6	
#40	16.6	16.7	30.1	70.1	
#50	15.7	15.8	45.9	54.4	
#100	14.7	14.8	60.6	39.8	
#200	8.7	8.7	69.4	31.1	
Pan					

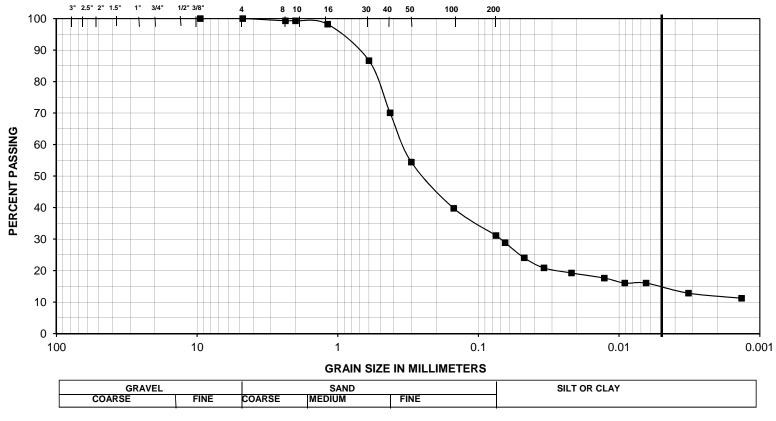


HYDROMETER TEST DATA SUMMARY ASTM D 422-63

PROJECT:		CA HSR F	RE_BAK			TES#:	23502-ZS9	
Boring Number		S003	30R			DATE: 9/20/2013		
Sample Depth, ft		41-4	1.5'	Sample No.:	<u>SS11</u>	TESTED BY:	K. Ford	
Mass of Test S	Sample, q		100.00	"air-dried"	٦	Hydrometer Type	151H	
	scopic Sample, g		49.30			, ,,		
	scopic Sample, g		49.10	"oven-dried"	Specific Gravity	of Test Material	2.650	
Mass of Test S	Sample, g		99.59	"oven-dried"	Specific Gravity	of Test Solution	Varies	
T:	I I I I I I I I I I I I I I I I I I I	0	T	E## D#-	0	D:t D	Anat Oversended D	
Time (min.)	Hydrometer Reading	Corrected Reading	Temperature Degrees C	Effective Depth Table 2 (cm)	Constant, K Table 3	Diameter, D (mm)	Amt. Suspended, P (%)	
	<u> </u>	·		`		,	()	
0.5	1.020	1.018	21	11.5	0.01348	0.0646	29.1	
1	1.017	1.015	21	12.3	0.01348	0.0473	24.2	
2	1.015	1.013	21	12.9	0.01348	0.0342	21.0	
5	1.014	1.012	21	13.1	0.01348	0.0218	19.4	
15	1.013	1.011	21	13.4	0.01348	0.0127	17.8	
30	1.012	1.010	21	13.7	0.01348	0.0091	16.1	
60	1.012	1.010	21	13.7	0.01348	0.0064	16.1	
250	1.010	1.008	21	14.2	0.01348	0.0032	12.9	
1440	1.009	1.007	21	14.4	0.01348	0.0013	11.3	
4140	1.010	1.008	21	14.2	0.01348	0.0008	12.9	



U.S. STANDARD SIEVE NUMBERS



—■— SS11

Sample #	Classification	% Gravel	% Sand	% Silt	% Clay*	% Moist.	LL	PL	PI	Project:	CA HSR FRE_BAK
SS11	(SM) Fine Silty Sand	0	69.4	15.6	15.0	0.4					
										TES#:	23502-ZS9
										Boring#:	S0030R
										Date:	9/20/2013

^{*} Particles smaller than 5 Micron in diameter



Sieve Analysis for Soil / Fine Aggregate ASTM C-136

 Project:
 CA HSR
 Technician:
 K. Ford

 Date:
 9/26/2013

 TES#:
 23502-ZS9
 Sample No.:
 SS19

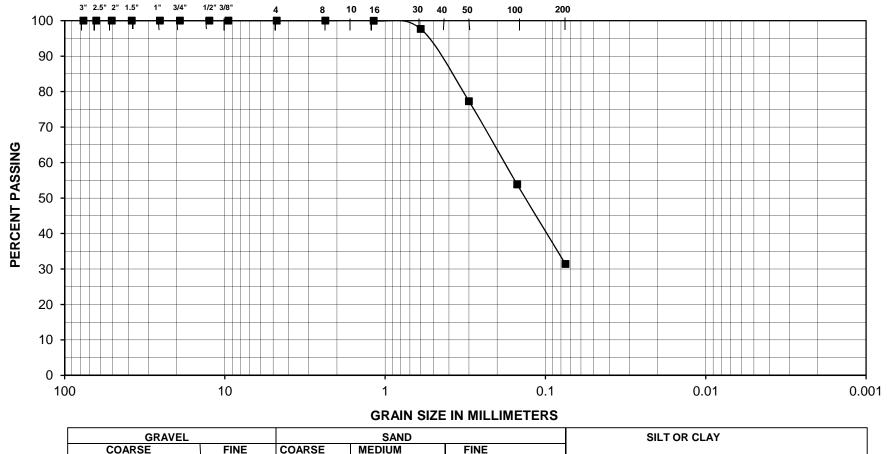
 Boring #:
 S0030R; 86-86.5'
 Classification:
 (SM) Silty Sand

	Weight	Maximum	Minimum Weight of
	(lbs. or grams)	Sieve Size	Test Specimen, lbs. (kg)
Total Dry Sample + Tare Wt.		Sand	1.0 (0.5)
Tare Weight		3/8"	2.0 (1.0)
Total Dry Sample Wt.	215.3	1/2"	4.0 (2.0)
Initial Weight Fine		3/4"	11.0 (5.0)
Aggregate Before Wash	215.3	1"	22.0 (10.0)
Final Weight Fine		1 1/2"	33.0 (15.0)
Aggregate After Wash	157.6	2"	44.0 (20.0)

	Cumulative	Individual	Cumulative	Cumulative	
Sieve	Weight	Weights	%	%	
Size	Retained	Retained	Retained	Passing	Specs.
3 in.			0.0	100.0	
2 1/2 in.			0.0	100.0	
2 in.			0.0	100.0	
1 1/2 in.			0.0	100.0	
1 in.			0.0	100.0	
3/4 in.			0.0	100.0	
1/2 in.			0.0	100.0	
3/8 in.			0.0	100.0	
#4	0.0	0.0	0.0	100.0	
#8	0.0	0.0	0.0	100.0	
#16	0.1	0.1	0.0	100.0	
#30	5.0	4.9	2.3	97.7	
#50	48.9	43.9	22.7	77.3	
#100	99.4	50.5	46.2	53.8	
#200	147.7	48.3	68.6	31.4	
Pan	157.6				



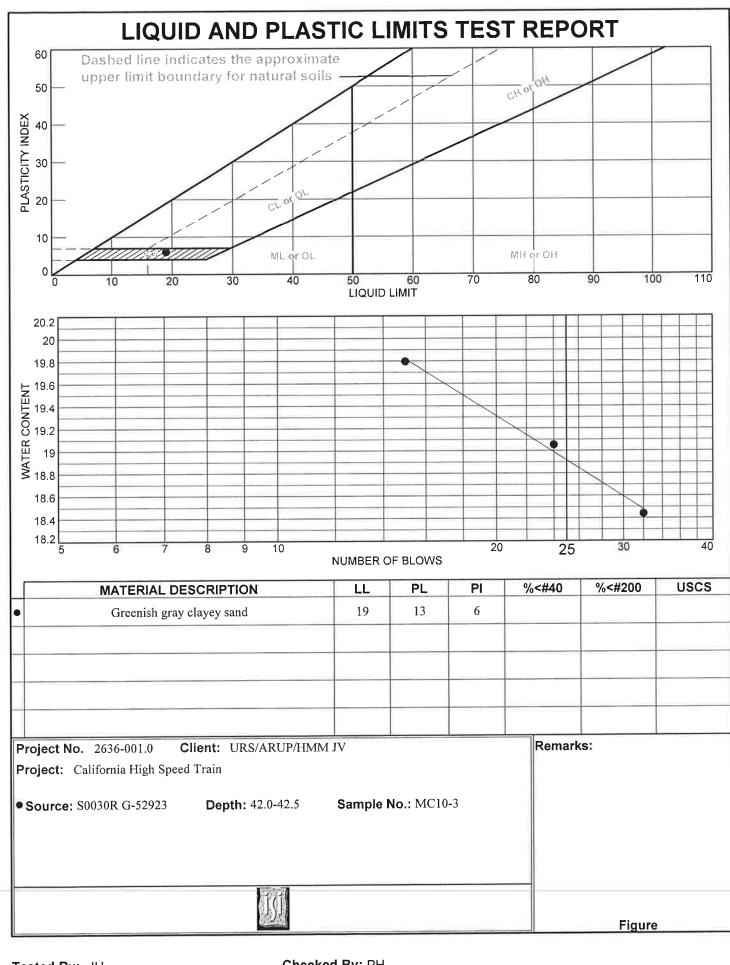
U.S. STANDARD SIEVE NUMBERS



GRAVEL			SAND		SILT OR CLAY
COARSE	FINE	COARSE	MEDIUM	FINE	

--SS19

Sample #	Classification	% Gravel	% Sand	% Silt	% Clay	% Moist.	LL	PL	PI	Project:	CA HSR
SS19	(SM) Silty Sand	0	68.6	31.4							
										TES#:	23502-ZS9
										Boring #	S0030R; 86-86.5'
										Date:	9/26/2013



Tested By: JH Checked By: PH



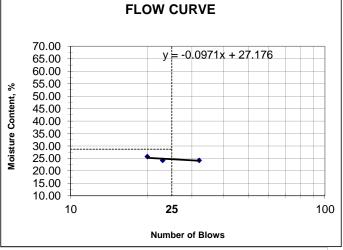
Determination of Atterberg Limits ASTM D 4318, CTM 204

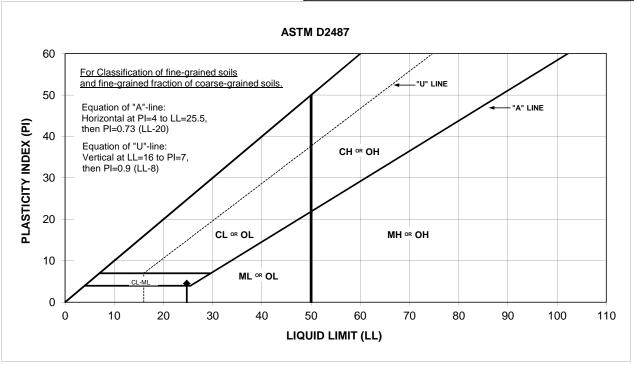
Project Name:	HSR					Project No.: 23502-ZS9	
Soil Boring No:	S0030R	Depth:	60.8-61.3'	Date:	9/24/13	Tested By: K. Ford	
Sample No.:	MC14-1					Classification: (ML) Silty Clay	

			PLASTIC LIMIT	
Α	Tes No.	1	2	3
В	Tare No.			
С	Mass of Pan + Dry Soil, g	28.80	36.00	30.20
D	Mass of Pan + Wet Soil, g	30.50	37.60	32.00
E	Mass of Pan, g	20.50	28.30	20.90
F	Mass of Water, g	1.70	1.60	1.80
G	Mass of Dry Soil, g	8.30	7.70	9.30
Н	Moisture Content, %	20.48	20.78	19.35
ı	Average Moisture Content, % (PL)	20.21	

		LIQUID LIMIT	
No. of Blows	20	23	32
	27.20	23.90	31.80
	28.90	24.70	32.60
	20.60	20.60	28.50
	1.70	0.80	0.80
	6.60	3.30	3.30
	25.76	24.24	24.24

Liquid Limit:	24.7
Plastic Limit: Line I	20.2
Plasticity Index: Pl = LL - PL	4.5







Determination of Atterberg Limits ASTM D 4318, CTM 204

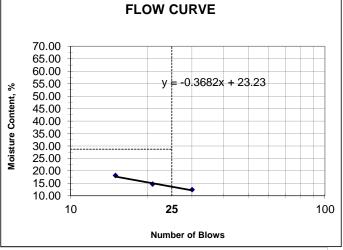
Project Name:	HSR					Project No.: 23502-ZS9	
Soil Boring No:	S0030R	Depth:	60.8-61.3'	Date:	9/24/13	Tested By: K. Ford	
Sample No.:	MC14-2					Classification: (ML) Silty Clay	

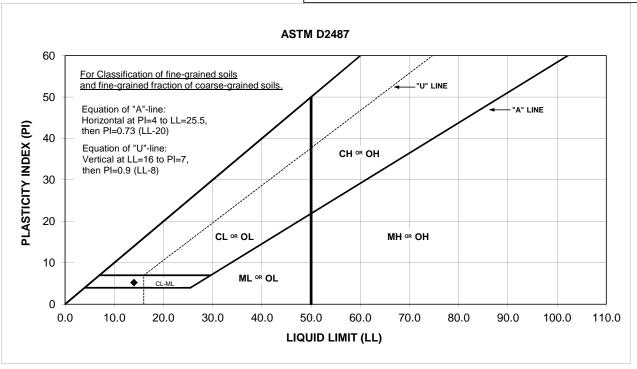
		1	PLASTIC LIMIT	Г
Α	Tes No.	1	2	3
В	Tare No.			
С	Mass of Pan + Dry Soil, g	35.60	34.10	32.90
D	Mass of Pan + Wet Soil, g	36.40	34.60	33.20
Е	Mass of Pan, g	28.50	28.20	28.40
F	Mass of Water, g	0.80	0.50	0.30
G	Mass of Dry Soil, g	7.10	5.90	4.50
Н	Moisture Content, %	11.27	8.47	6.67
ı	Average Moisture Content, % (PL)	8.80	

No. of Blows	30	15	21
	26.50	35.10	35.10
	27.20	36.30	36.10
	20.90	28.50	28.30
	0.70	1.20	1.00
	5.60	6.60	6.80
	12.50	18.18	14.71

LIQUID LIMIT

Liquid Limit:	14.0
Plastic Limit: Line I	8.8
Plasticity Index: Pl = LL - PL	5.2







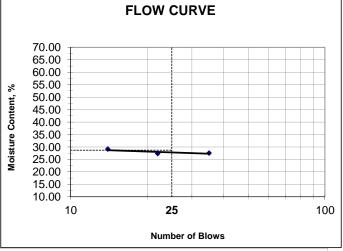
Determination of Atterberg Limits ASTM D 4318, CTM 204

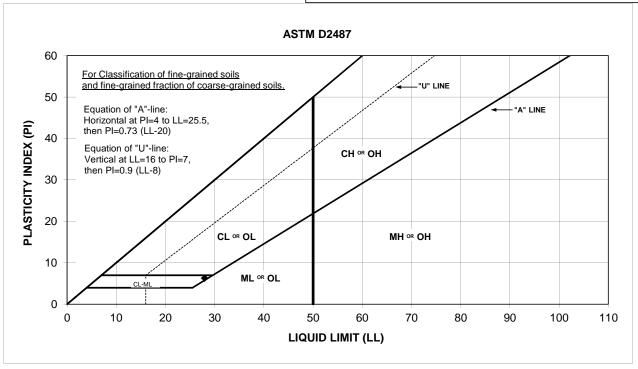
Project Name:	HSR		Project No.: 23502-ZS9				
Soil Boring No:	S0030R	Depth:	70.5-71'	Date:	9/27/13	Tested By: K. Ford	
Sample No.:	MC16-2					Classification: (SM) Silty Sand	

		PLASTIC LIMIT					
Α	Tes No.	1	2	3			
В	Tare No.						
С	Mass of Pan + Dry Soil, g	32.80	34.30	27.00			
D	Mass of Pan + Wet Soil, g	33.80	35.60	28.40			
Е	Mass of Pan, g	28.20	28.30	20.50			
F	Mass of Water, g	1.00	1.30	1.40			
G	Mass of Dry Soil, g	4.60	6.00	6.50			
Н	Moisture Content, %	21.74	21.67	21.54			
ı	Average Moisture Content, % (PL)		21.65				

PLASTIC LIMIT					LIQUID LIMIT	
1	2	3	No. of Blows	14	35	22
32.80	34.30	27.00		30.60	31.00	37.80
33.80	35.60	28.40		31.30	31.80	40.40
28.20	28.30	20.50		28.20	28.10	28.30
1.00	1.30	1.40		0.70	0.80	2.60
4.60	6.00	6.50		2.40	2.90	9.50
21.74	21.67	21.54		29.17	27.59	27.37

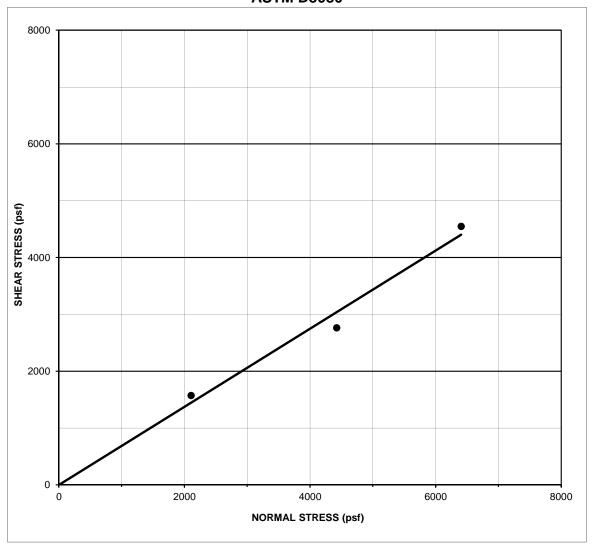
Liquid Limit:	28.0
Plastic Limit: Line I	21.6
Plasticity Index: Pl = LL - PL	6.3







Direct Shear Test ASTM D3080



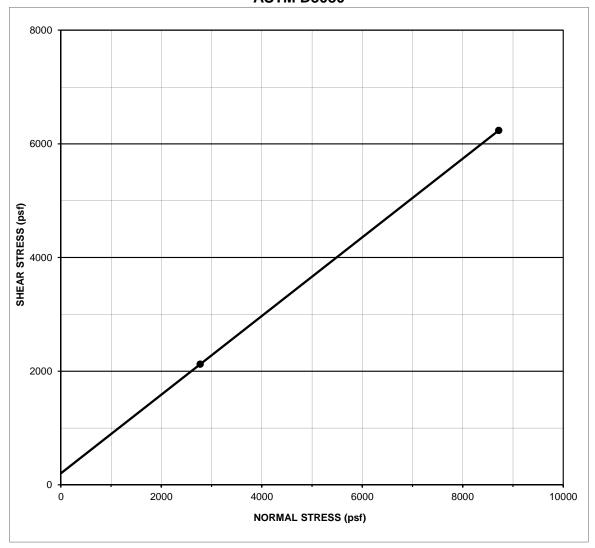
PROJECT:	HSR
TES NO.:	23502-ZS9
SAMPLE DATE.:	9/13/2013
BORING NO.:	S0030R
SAMPLE NO.:	MC03-1 Depth(11'-11.5')
DESCRIPTION:	Fine Sand (SP)

Cohesive Pressure, psf	0
Internal Friction Angle	35

SPECIMEN	А	В	С	D	Е
DRY DENSITY (pcf)	104.7	104.7	104.7		
INITIAL WATER CONTENT (%)	0.3	0.3	0.3		
FINAL WATER CONTENT (%)	29.80	27.70	27.80		
NORMAL STRESS (psf)	2108	4426	6407		
MAXIMUM SHEAR (psf)	1572	2764	4549		



Direct Shear Test ASTM D3080



PROJECT:	HSR
TES NO.:	23502-ZS9
SAMPLE DATE.:	9/13/2013
BORING NO.:	S0030R
SAMPLE NO.:	MC07-1 Depth(31'-31.5')
DESCRIPTION:	Fine Sand (SP)

Cohesive Pressure, psf	200
Internal Friction Angle	35

SPECIMEN	Α	В	С	D	E
DRY DENSITY (pcf)	105.7		105.7		
INITIAL WATER CONTENT (%)	7.7	TEST	7.7		
FINAL WATER CONTENT (%)	24.50	FAILED	26.10		
NORMAL STRESS (psf)	2775	FAILED	8717		
MAXIMUM SHEAR (psf)	2123		6236		

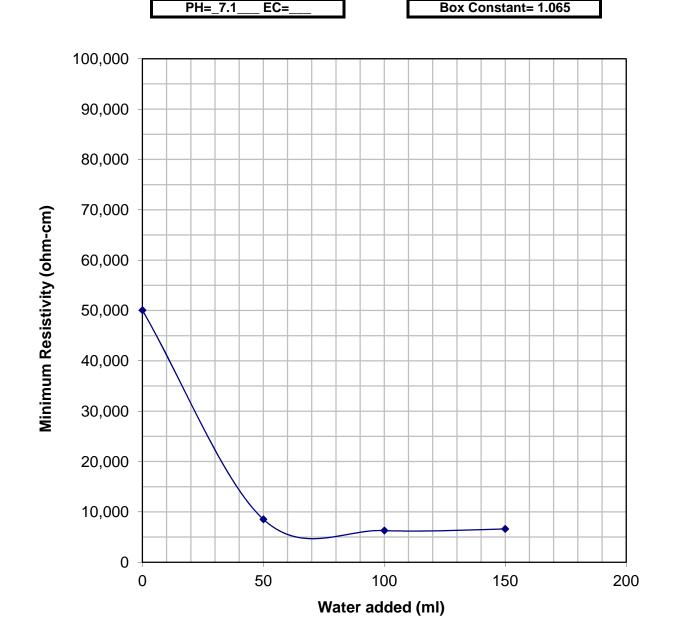


MINIMUM RESISTIVITY; ASTM G57

Project Name	CA HSR FRE_BAK	Sample Number	B01
Project Number	23502-ZS9	Sample Location	Boring S0030R
Sample Date	9/7/2013	Material Description	ML
Sampled By	M. Walker	_	_

Sample Condition	As Received	Minimum Resistivity					
Water Added (ml)	0	50	100	150			
Resistance (ohm)	47,000	8,000	5,900	6,200			
Resistivity (ohm-cm)	50,055	8,520	6,284	6,603	0	0	0

Minimum Resistivity (ohm-cm)_6,284	Field Resistivity (ohm-cm)





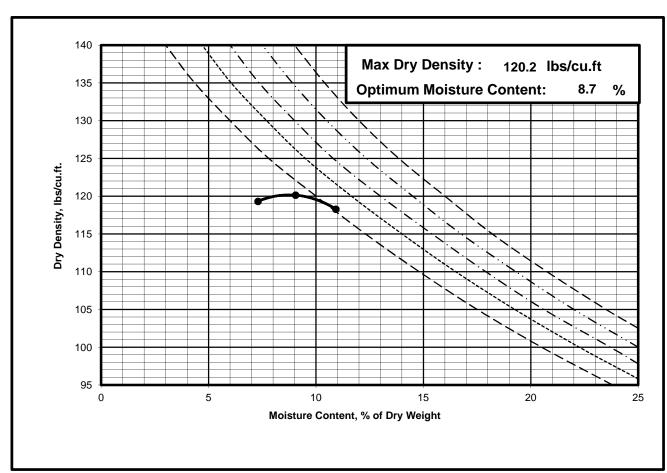
ASTM D - 1557

Project Number : 23502-ZS9

Project Name : HSR

Date : 9/23/2013 Sample location : S0030R Sample/Curve Number : B-01 Soil Classification : SM Test Method : 1557A

	1	2	3	4
Weight of Moist Specimen & Mold, gm	3942.1	3939.0	3894.0	
Weight of Compaction Mold, gm	1960.2	1960.2	1960.2	
Weight of Moist Specimen, gm	1981.9	1978.8	1933.8	
Volume of mold, cu. ft.	0.0333	0.0333	0.0333	
Wet Density, lbs/cu.ft.	131.2	131.0	128.0	
Weight of Wet (Moisture) Sample, gm	200.0	200.0	200.0	
Weight of Dry (Moisture)Sample, gm	180.3	183.4	186.4	
Moisture Content, %	10.9	9.1	7.3	
Dry Density, lbs/cu.ft.	118.3	120.1	119.3	





California Bearing Ratio

ASTM D - 1883

Project Number : 23502-ZS9

Project Name : CA HST - Fre_Bak

Date : 9/27/13 Sample Location/Curve Number : B-01, 0-5' Sample Location/Curve Number : S0030R

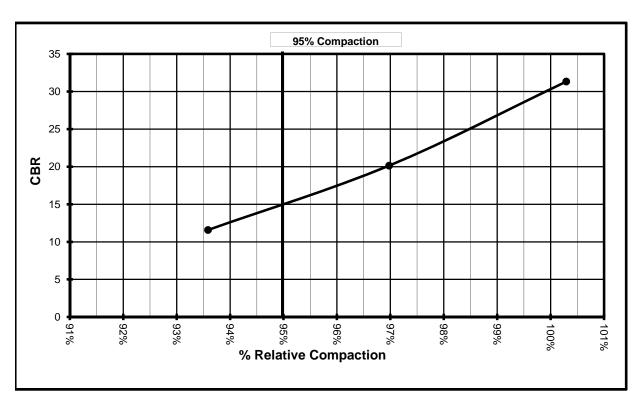
Soil Classification : SM - Fine-Med Lt. Brown

Method of Compaction : ASTM D 1557

TEST	Α	В	С
Max Dry Density @ Optimum, lb/cu.ft.	120.3	120.3	120.3
Percent Moisture as Compacted, %	10.5%	10.4%	10.6%
Dry Density, lb/cu.ft.	120.7	116.7	112.6
Percent Relative Compaction. %	100.3%	97.0%	93.6%
Surcharge Weight, lb	10	10	10
Percent Moisture @ Testing %	11.2%	12.0%	14.7%
Penetration Depth Check, in	0.50	0.50	0.50
Load @ 0.100" Penetration, lb	30	29	64
Stress @ 0.100" Penetration, psi	68	62	22
Swell During Saturation, %	0.63%	1.00%	1.94%
CBR Value	31	20	12

CBR @ 95% Relative Compaction

(15)



Chemical Analysis

SO₄ - Modified Caltrans 417 & CL - Modified Caltrans 417/422

SEG Project Number : 1-513-0002
TES Project Number : 23502-ZS9
Date : 09/23/13
Sample Location : B-1 @ 1'

Soil Classification :

Sample Number	Soluble Sulfate SO ₄ -S		Soluble Chloride Cl		
B-1 @ 1'	50	mg/Kg	23	mg/Kg	
B-1 @ 1'	50	mg/Kg	25	mg/Kg	
B-1 @ 1'	50	mg/Kg	25	mg/Kg	
Average	50	mg/Kg	24	mg/Kg	

